Precalc Warm Up # 8-5

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Best first step, use pyth. identity here then factor difference of squares.

Using the conjugate is another way, but takes longer. !!

$$\frac{(1-\csc x)}{(1-\csc x)}\frac{\cot^2 x}{(1+\csc x)} = \frac{1-\sin x}{\sin x}$$

$$\frac{\cot^2 x(1-\csc x)}{1-\csc^2 x} = \frac{1-\sin x}{\sin x}$$

$$\frac{\cot^2 x(1-\csc x)}{1-(1+\cot^2 x)} = \frac{1-\sin x}{\sin x}$$

$$\frac{\cot^2 x(1-\csc x)}{-\cot^2 x} = \frac{1-\sin x}{\sin x}$$

$$-1+\csc x = \frac{1-\sin x}{\sin x}$$

$$-\frac{\sin x}{\sin x}+\frac{1}{\sin x} = \frac{1-\sin x}{\sin x}$$

$$\frac{1-\sin x}{\sin x} = \frac{1-\sin x}{\sin x}$$ ✓

In Exercises 1–60, verify the given identity.

5. $\cos^2\beta - \sin^2\beta = 1 - 2\sin^2\beta$

9. $\sin^2\alpha - \sin^4\alpha = \cos^2\alpha - \cos^4\alpha$

13. $\dfrac{\cot^2 t}{\csc t} = \csc t - \sin t$

17. $\dfrac{1}{\sec x \tan x} = \csc x - \sin x$

$\cos x \cdot \cot x =$

$\cos x \cdot \dfrac{\cos x}{\sin x} =$

$\dfrac{\cos^2 x}{\sin x} =$

$\dfrac{1-\sin^2 x}{\sin x} =$

$\dfrac{1}{\sin x} - \dfrac{\sin^2 x}{\sin x} =$

$\csc x - \sin x = \csc x - \sin x$

21. $\csc x - \sin x = \cos x \cot x$

29. $2\sec^2 x - 2\sec^2 x \sin^2 x - \sin^2 x - \cos^2 x = 1$

$2\sec^2 x(1 - \sin^2 x) - 1(\sin^2 x + \cos^2 x)$

$2 \cdot \frac{1}{\cos^2 x} \cos^2 x - 1$

$2 - 1$

$1 = 1$ ✓

25. $\frac{(1+\sin\theta)}{(1+\sin\theta)(1-\sin\theta)}\cos\theta\cot\theta - 1 = \csc\theta$

$\frac{\cos\theta\cot\theta(1+\sin\theta)}{1-\sin^2\theta} - 1$

$\frac{\cos\theta\cot\theta(1+\sin\theta)}{\cos^2\theta} - 1$

$\frac{1}{\cos\theta}\left(\frac{\cos\theta}{\sin\theta}\frac{(1+\sin\theta)}{1}\right) - 1$

$\frac{1+\sin\theta}{\sin\theta} - \frac{\sin\theta}{\sin\theta}$

$\frac{1}{\sin\theta}$

$\csc\theta = \csc\theta$ ✓

33. $\csc^4 x - 2\csc^2 x + 1 = \cot^4 x$

37. $\dfrac{\sin\beta}{1-\cos\beta} = \dfrac{1+\cos\beta}{\sin\beta}$

41. $\cos\left(\dfrac{\pi}{2} - x\right)\csc x = 1$

45. $\dfrac{\cos(-\theta)}{1+\sin(-\theta)}$

45. $\dfrac{\cos(-\theta)}{1+\sin(-\theta)} = \sec\theta + \tan\theta$

49. $\dfrac{\tan x + \cot y}{\tan x \cot y} = \tan y + \cot x$

$$\frac{\tan x}{\tan x \cot y} + \frac{\cot y}{\tan x \cot y} =$$

$$\frac{1}{\cot y} + \frac{1}{\tan x} =$$

$$\tan y + \cot x = \tan y + \cot x \checkmark$$

53. $\ln|\tan\theta| = \ln|\sin\theta| - \ln|\cos\theta|$

$$\ln\left|\frac{\sin\theta}{\cos\theta}\right| =$$

$$\ln|\sin\theta| - \ln|\cos\theta|$$

57. $\sin^2 x + \sin^2\left(\dfrac{\pi}{2} - x\right) = 1$

In Exercises 61–64, explain why the equation is *not* an identity and find one value of the variable for which the equation is not true.

63. $\sqrt{\tan^2 x} = \tan x$

$\sqrt{(\tan x)^2}$

HW: PC book p. 411
odds that are not boxed,
skip 3, 7, 23